

## A STUDY ON THE EXTENT OF ADOPTION OF IMPROVED GINGER CULTIVATION PRACTICES BY THE FARMERS IN RI-BHOI DISTRICT OF MEGHALAYA

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### ABSTRACT

*A study was conducted in Ri-bhoi District of Meghalaya, with the objective of studying the extent of adoption of improved ginger cultivation practices, by the farmers. For the purpose of the study 120 ginger growers were selected. Ex post facto research was followed. The collected data were processed through descriptive statistics, correlation analysis and regression analysis. The results revealed that, majority of the respondents (72.50%) had medium level of adoption. Correlation analysis revealed that, variables namely family type, size of operational land holding, occupational status, mass media exposure, extension contact, risk preference and economic motivation. Further, for regression analysis, the variables which were found to have significant relationship with the dependent variable were considered. Thus, this signified that, seven variables taken together could explain 54.1 percent, of the total variation in respondent's extent of adoption.*

**KEYWORDS:** Ginger, Extent of Adoption

**Received:** Jun 15, 2017; **Accepted:** Jul 07, 2017; **Published:** Jul 20, 2017; **Paper Id.:** IJASRAUG201748

### INTRODUCTION

Ginger (*Zingiberofficinale* Roscoe.) is one of the important cash crops and spices, grown in India and in many other tropical and sub-tropical regions of the world. Ginger, the rhizome or the underground modified stem of the plant' belonging to the 'Zingiberaceae' family, is an important commercial spice crop grown from very ancient times in India. Northeast India is also considered as an important ginger growing area and states like Meghalaya, Arunachal Pradesh and Mizoram are found to be the leading ginger producing states. The state of Meghalaya, which is termed as the Scotland of the East, is one of the important states of the North Eastern Region. Ginger is an important cash crop of Meghalaya state, which in turn plays an important role in the farmer's economy. Meghalaya is the second largest producer of ginger in the north eastern region. It has about 9752 hectares of land under ginger cultivation and produces nearly 63251 metric tonnes of ginger, annually. In Meghalaya, the Ri-Bhoi district ranks third in terms of ginger production, producing about 10500 metric tonnes of ginger from a land of 10574 hectares (2013-14). Likewise, in other states of the region, ginger cultivation is being done in almost all the districts, but the important ginger producing districts are East Garo hills, West Garo hills, East Khasi hills, South West Khasi hills and West Jaintia hills. Ginger is an important cash crop and plays an important role in rural economy of Khasi farmers (Triparthiet al. 2008). List of varieties being grown in the state are Nadia, Khasi local, Sying met, Syingmakhir, Ing bah, Syingsmoh, Moran and Rio de Janeiro.

## METHODOLOGY

The present study was conducted in Ri-bhoi district of Meghalaya. There are three (3) development blocks viz., Umling, Umsning and Jirang, in Ri-Bhoi district. The Umsning development block was purposively selected, for carrying out the present piece of work because of the overall acreage and the production point that was being taken into consideration. From the selected development block, six number of villages namely UmroiMadan, Mawbri, Liarkhla, UmranNiangbyrnai, Nongrimladew, Kyrdem were randomly selected from the number of ginger growing villages so as to carry out the present study. A list of ginger growing farmers was prepared for each of the selected villages. From those lists, a total sample of 120 farmers was selected as respondents for the study by following proportionate random sampling technique. The data were collected through structured interview schedules. Extent of adoption of selected improved ginger cultivation practices by the farmers has been conceived as the adoption of recommended cultivation practices against three response categories viz., full adoption, partial adoption and no adoption. If a farmer was found to adopt a given practice as per recommendations, it was considered as full adoption which was assigned a score of 2. A deviation from the recommended practice was considered as partial adoption and that was assigned a score of 1. Now farmers, who did not follow the recommended practices at all were considered under the no adoption category and for it, he or she were assigned a score of 0. The total score obtained by a respondent was calculated by adding the adoption scores for all the practices followed by that respondent.

## OBSERVATION AND ANALYSIS

**Table 1: Distribution of Respondents According to Extent of Adoption of Improved Ginger Cultivation Practices**

Practice	Full Adoption Frequency%	Partial Adoption Frequency%	No Adoption Frequency%
<b>Improved Variety</b>	120(100.0)	0(0.00)	0(0.00)
<b>Rhizome Selection Procedure:</b>			
i. Size of rhizomes	41(34.17)	79(65.83)	0(0.00)
i. Weight	34(28.33)	86(71.67)	0(0.00)
i. Maturity	120(100.0)	0(0.00)	0(0.00)
<b>Land Preparation:</b>			
i. Size of beds	120(100.0)	0(0.00)	0(0.00)
i. FYM used	25(20.83)	0(0.00)	95(79.17)
ii. Quantity used	0(0.00)	25(20.83)	95(79.17)
iii. Time	25(20.83)	0(0.00)	95(79.17)
<b>Seed Rate</b>	0(0.00)	120(100.0)	0(0.00)
<b>Seed Treatment:</b>			
i. Chemical seed treatment	0(0.00)	0(0.00)	120(100.0)
<b>Spacing:</b>			
i. Plant-plant	74(61.67)	46(38.33)	0(0.00)
ii. Row-row	62(51.67)	58(48.33)	0(0.00)
iii. Depth	0(0.00)	120(100.0)	0(0.00)
<b>Planting Time</b>	120(100.0)	0(0.00)	0(0.00)
<b>Mulching:</b>			
i. Material	79(65.83)	0 (0.00)	41(34.17)
ii. Time of mulching	79(65.83)	0(0.00)	41(34.17)
<b>Dose of fertilizer :</b>	0(0.00)	0(0.00)	120(100.0)
<b>Weeding:</b>			
Type of weeding	120(100.0)	0(0.00)	0(0.00)
i. No. of weeding	53(44.17)	67(55.83)	0(0.00)

<b>Table 1: Contd.,</b>			
ii.	Time/month	0(0.00)	120(100.0)
<b>Plant protection measures:</b>			
i.	Chemical used (pest)	0(0.00)	120(100.0)
ii.	Quantity used	0(0.00)	120(100.0)
i.	Chemical used (disease)	0(0.00)	120(100.0)
ii.	Quantity used	0(0.00)	120(100.0)
<b>Harvesting :</b>			
i.	Time	120(100.0)	0(0.00)
ii.	Type	120(100.0)	0(0.00)
iii.	Method	120(100.0)	0(0.00)

**Note:** Figures in parentheses indicate percentages

It can be observed from Table1 that, the overall (100%) respondents taken under study fully adopted the practice of growing improved varieties like Nadia and Moran. Thus, the reason behind full adoption was basically due to the fact that, the farmers were well aware of the improved varieties' good yield and their suitability to prevailing situations. It can be observed that, 34.17 per cent and 28.33 per cent of the respondents fully adopted the practices, of using the right size of rhizomes and the right weight, respectively. And respondents who partially adopted these practices include 65.83 per cent and 71.67 per cent, respectively. When we talk about maturity, all respondents 100 per cent fully adopted the practice. The reason behind partial adoption of the practice of using the right size of rhizomes and weight might be basically due to the fact that they were mostly habituated with the practice of not keeping in mind the rhizome germination percentage so as to maintain proper plant population. It can be observed that all (100%) of the respondents fully adopted the practice of having the right size of beds for ginger cultivation. The reason behind full adoption maybe due to the fact they were aware of this practice and also because they have adjusted to the practice since a very long period of time. It had also been observed by the researcher that few of the respondents added manures to their land during the time of land preparation. These respondents who fully adopted the practice of adding manures and doing it at the recommended point of time accounted for only 20.83 per cent. Regarding the quantity being used, only 20.83 per cent of the respondents partially adopted the practice. The reason behind adding manures to the soil was because farmers felt that this would boost up the soil quality and thus enhance their production. The observation also revealed that majority (79.17 %) of respondents had not adopted the recommended practice of applying manures to the soil during land preparation. This might be due to the fact that farmers believed that the soil was fertile enough to provide whatever nutrients were required by the ginger rhizomes, and adding any extra nutrient or manure to it would only upset the balance of the soil content. The Table above also revealed that all respondents (100%) partially adopted the practice of using the right seed rate of ginger cultivation and reason behind partial adoption of the practice might be due to the fact that respondents had to sow seeds depending on the quantity available with them as well as they could only plant a certain amount of seed depending on the size of the land. It was also found that (100 %) of the respondents had not adopted the practice of seed treatment for ginger cultivation. The reason behind no adoption of the practice might be because respondents felt that treating seeds with medicines would only tamper with the contents of the rhizomes and thus destroy the quality of the rhizome. According to them, drying of seeds in the sun or shade for a day or two was sufficient enough. Table above also revealed that majority of the respondents (61.67%) fully adopted the practice of plant to plant spacing followed by 38.33 per cent of the respondents who partially adopted the practice. And then, about (51.67%) of the respondents fully adopted the practice of row to row spacing followed by 48.33 per cent who partially adopted the practice. Lastly, all (100%) respondents partially adopted the practice of sowing the seeds at the right depth because according to them seeds were to be placed in the soil depending on their sizes. The reason for partial adoption of all the three practices might be due to the fact that farmers were not aware of the recommended

spacing and depths which was (15cmX30cmX4cm). It could be observed that all respondents (100%) fully adopted the practice of planting or sowing time of rhizomes. i.e., during the month of April-May. The reasons for full adoption of the practice might be that the farmers were aware of the correct planting time and also due to the onset of monsoon during this period. It was revealed that majority (65.83%) of the respondents fully adopted the practice of mulching followed by 34.17 per cent of the respondents who had not adopted. The reason behind no adoption might be due to the fact that farmers felt, the practice was either too laborious or time consuming or else they thought that covering the rhizomes with just soil was more than enough. Thus, it was observed that all (100%) respondents had not adopted the practice of fertilizer application for the purpose of ginger cultivation, i.e., it was found to be nil. The reason behind their non-adoption might be due to the fact that respondents believed that the soil was fertile enough to supply all the required nutrients to the crop. The Table above also revealed that almost all of the respondents (100%) fully adopted the practice of choosing the right type of weeding method i.e., manual weeding. Now, majority (55.83%) of the farmers partially adopted the practice, for the number of weeding done, followed by 44.17 per cent of the respondents, who actually fully adopted the correct practice. Along with that, we have (100%) of the respondents who partially adopted the correct practice for doing the weeding process at the right time. The reasons behind partial adoption of the above two practices could be from the fact that the farmers were not aware of the appropriate numbers and timings of weeding, or else their negligence towards the correct form of practice. Thus, it was observed that all respondents (100%) had not adopted the practice of plant protection measure for ginger cultivation. The reason behind their non-adoption might be because the respondents felt that if they treated diseases and pests with certain chemicals, then this would only harm the soil and thus make their land unfavorable for future cultivation purpose. Also respondents believed that uprooting of infected ginger plants and rhizomes was the best solution to prevent further spreading of diseases and pests. Lastly, it was revealed that all respondents (100%) had done the harvesting process at the appropriate time in December, using the most correct type, i.e., manually and correct method i.e., the use of a spade. And reason for full adoption would be because of their awareness about this practice.

**Table 2: Distribution of Respondents According to Overall Extent of Adoption of Improved Ginger Cultivation Practices (n = 120)**

Category	Frequency	Percentage
Low	20	16.67
Medium	87	72.50
High	13	10.83

A majority (72.5%) of the respondents belonged to the medium level of adoption category of overall adoption of improved ginger practices.

## **SOCIO ECONOMIC CHARACTERISTICS**

**Table 3: Relationship between Independent Variables and Overall Extent of Adoption of Improved Ginger Cultivation Practices**

Independent Variables	Correlation Coefficient (R)
Age	0.078
Educational level	-0.021
Family type	0.276*
Size of operational land holding	0.222*
Annual income	0.128
Occupational status	0.242*
Mass media exposure	0.459*
Extension contact	0.416*

Table 3: Contd.,	
Risk preference	0.476*
Economic motivation	0.470*

\*Significant at 0.05 level probability

To find out the relationship between ten selected independent variables and the dependent variable Pearson's correlation coefficient was worked out.

Analysis of socio economic characteristics and extent of adoption indicated that age of the respondents had no significant relationship with the overall extent of adoption. Similar kinds of findings were also reported by Bezborra and Bordoloi (1979), Makarau *et al.*, (2013) and Singh (1991).

Education of the respondents had no significant relationship with the overall extent of adoption. Therefore, the null hypothesis ( $H_0$ ), i.e., there is no significant relationship between the education level of the farmers and their extent of adoption could not be rejected.

The findings of the correlation analysis showed that family type of the respondents was found to be positively and significantly correlated with the overall extent of adoption. The result of this study was also supported by Kiranmai *et al.*, (2015). Hence this indicated that the extent of adoption was more with farmers who had joint family type.

Operational land holding of the respondents was found to be positively and significantly correlated with the overall extent of adoption. This indicated that more the size of operational land holding more was the extent of adoption. This might be due to the fact that respondents who have more area under cultivation are more aware and conscious regarding their extent of adoption. Such findings were also reported by Rogers (1961), Sanders (1995) and Bokulo *et al.* (2015).

Annual income of the respondents had no significant relationship with the overall extent of adoption. And similar or relevant findings were reported by Singh (2005), More *et al.*, (2014) and Bokulo *et al.*, (2015).

Occupational status was found to have a positive and significant relationship with the extent of adoption. And relevant findings was reported by Singh (2005)

Mass media exposure of the respondents was found to possess a positive and significant relationship with the overall extent of adoption. This revealed that when the respondents were exposed to mass media, their adoption behavior was better. Similar findings were reported by Kiranmai *et al.* (2015).

The finding of the correlation analysis also revealed that extension contact of the respondents was found to be positively and significantly correlated with the overall extent of adoption. It indicated that more the extension contact more was the extent of adoption. This might be due to the fact that when farmers had more contact with extension personnel's, this helped them in acquiring more information, get more material support, develop their confidence and thereby increasing the credibility of improved ginger cultivation practices. Similar findings were also reported by Raut (1974), Shukla (1980) and Folurunso and Adenuga (2013).

Risk preference of the respondents was found to be positive and significantly correlated with the overall extent of adoption. It indicated that more the risk preference of the respondents more was the adoption. It might be due to the fact that lower the risk preference more was the chance in making big profit which leads to more extent of adoption of improved ginger cultivation practices by the respondents.

It was revealed economic motivation of the respondents was found to be positively and significantly correlated with the extent of adoption. This indicates that the more economic motivation of the respondents more was the adoption. This might be due to the fact that economic motivation motivates a farmer to adopt modern ways of farming as well as develop positive attitude towards modes farming techniques. Similar findings were reported by Kaushal (2010), Darnal and Banyopadhyaya (2014) and More *et al.* (2014).

### Influence of the Selected Independent Variables on the Dependent Variable

Regression analysis was employed to determine the combined effect of independent variables on the dependent variable. The independent variables which were found to have significant relationship with the dependent variables were considered for regression analysis.

The multiple regression analysis with all 7 predictors produced  $R^2 = 0.541$ , Adjusted  $R^2 = 0.512$ ,  $F = 18.88$ ,  $p < 0.01$ . Since, the F value was significant at 0.01 level of significant so the null hypothesis ( $H_0$ ) was rejected. The  $R^2$  value 0.541 clearly signifies that seven independent variables taken together could explain 54.1 per cent of the total variation in respondent's extent of adoption of improved packages of ginger cultivation. This model explains that the selected predictors accounted for 54.1 per cent of adoption behavior. The findings indicated that 45.9 per cent of the variations in the dependent variable remain unexplained. So there is scope for incorporating more number of relevant variables in the regression equation for future study which would explain the remaining part of the variation in the dependent variable.

**Table 4: Influence of the Selected Independent Variables on the Dependent Variable**

Variables	$R^2$	Adjusted R	F Value	Regression Coefficient(b)	'T' Value
Family type	0.541	0.512	18.88**	0.288	0.806
Size of operational land holding				0.423**	2.370
Occupational status				0.482**	2.406
Mass media exposure				0.182**	3.601
Extension contact				0.291**	3.575
Risk preference				0.305**	3.478
Economic motivation				0.344**	4.390

\*\*Significant at 0.01 level of probability

Further analysis of 't' value of regression coefficients (b) indicated that size of operational land holding, occupational status, mass media exposure, extension contact, risk preference, economic motivation of ginger growers had significant contribution in influencing the extent of adoption of improved packages of ginger cultivation.

### CONCLUSIONS

The independent variables which were found to have significant relationship with the dependent variables were considered for regression analysis this model explains that the selected predictors accounted for 54.1 per cent of adoption behavior. The findings indicated that 45.9 per cent of the variations in the dependent variable remain unexplained. So there is scope for incorporating more number of relevant variables in the regression equation for future study which would explain the remaining part of the variation in the dependent variable.

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